Ad hoc Committee second round review: "Measurement of deeply virtual Compton scattering off Helium-4 with CLAS at Jefferson Lab"

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Having discussed your second draft and replies to our comments, we are satisfied on all points except 2 and 5. We'll start with the minor quibble.

Point 5

You have left the sentence: *"Its historic use to measure DVCS in many different configurations made it an ideal place for this new DVCS measurement."* Our objection is mostly focused on the word "ideal," which connotes "perfection." (Also historic is not quite the word you want.) You have explained what you mean to communicate, and so we urge you to write: *"It was naturally well-suited for measuring DVCS, and several DVCS experiments were successfully conducted using multiple different configurations."*

Point 2:

Our remaining concern is still on the subtraction of background coming from exclusive π^0s with a missing photon. Your response was helpful in correcting some of our misunderstandings. We think this is a complicated point because the problem is nested.

1. There is the BSA in the π^0 production itself.
2. There is the possibility of an apparent BSA in the ϕ distribution that you reconstruct from the single detected photon, when you are forced to (incorrectly) assume that the process is DVCS.
3. There is the change in BSA that happens as a part of the subtraction of the π^0 background.

Let us address each.

1. The use of a π^0 generator with no BSA is an interesting analysis choice. I don't think it's our committee's job to critique that choice. It's clear that the MC does a good job of reproducing incoherent exclusive π^0 data (your Fig. 15) so the choice is well-motivated. It's interesting that this contrasts with a measured BSA in exclusive π^0 production on a protonn. You haven't given us enough to understand whether your data could see 5–10% BSA. We think it's your choice how deep you want to go when discussing that in the paper. We'd prefer more discussion, but that's your choice to make.
2. You have pointed out that Figs. 14 and 15 show good agreement between the π^0 simulation and the measured π^0 data. But this doesn't answer our concern about what the distribution of π^0 single photon events looks like when binned according to the ϕ you would use when you assume the event is DVCS. Your simulation can answer that question. It seems like that distribution is what really matters when assessing a false BSA coming from π^0s. Are we being naive in asking that? Is guaranteed to be flat for some reason that we don't understand?
3. It's not clear what (if any) correction you are making to your reported BSA. You write:

   "to make the correction on the DVCS BSA, ...

   [implying you are making a correction]

   ... we assume that the exclusive π^0 production has no such assymmetry. ...

[fine, but that's not the relevant ϕ angle!]

... This has been checked with the exclusive π^0 production data for which no significant level of BSA was measured."

This still leaves questions un-answered for the reader. For the committee to be happy to approve this paper, we would like:

- The sentence about the BSA to be made more clear. Are you making a correction for π^0 contamination? Are you not making a correction? How big is the correction to the BSA you extract?
- Some response (doesn't have to go in the paper) about what the simulated distribution of π^0 events with a missing photon looks like, when binned in the ϕ that you calculate assuming DVCS. Is it flat? Is there a fake BSA? Is there some reason why we are naive to think that this is important? We need to know more to assess whether or not what you have written is clear and accurate.

A ϕ distribution of the A_{LU} before and after the correction for the $N_{1\gamma,\pi^0}$ contamination would go a long way to satisfy everyone on the issue of π^0 background in the incoherent case.